UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,580	03/27/2007	Shoufeng Wang	09548.1030USWO	5366

52835 7590 09/28/2011

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
P.O. BOX 2902
MINNEAPOLIS, MN 55402-0902

EXAMINER	
STEIN, MICHELLE	

ART UNIT	PAPER NUMBER
1771	

MAIL DATE	DELIVERY MODE
09/28/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,580	WANG ET AL.	
	Examiner	Art Unit	
	MICHELLE STEIN	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-10* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-10* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20060525*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Examiner suggests fixing minor typos in the specification. For example, on page 4, line 12, "crasher" should be replaced with - - crusher - -, and on page 6, line 9, "distillating" should be replaced with - - distillation- -.

Appropriate correction is required.

Claim Objections

2. Claim 1 is objected to because of the following informalities: Examiner suggests replacing "distillating" with - -distillation- -. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Archer (US 4,412,910).

5. Regarding claim 1, Archer teaches crushing oil shale (column 4, lines 54-58) and feeding to a fluidized bed pyrolysis reactor (column 4, lines 66). Vapor and gaseous oil products are obtained (column 4, lines 66-68), as well as oil shale (column 5, lines 1-2). The oil gas products are recovered and used in the process or in part collected for commercial or other uses (column 5, lines 25-35).

6. Regarding claim 8, Archer teaches an oil shale feed (column 4, lines 53-65).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 2-5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Archer (US 4,412,910).

10. Regarding claim 2, Archer teaches the limitations of claim 1, as discussed above.

11. Archer further teaches feeding the pyrolyzed shale to another fluidized bed fro gasification in the presence of oxygen (column 5, lines 3-14). The residual carbon is burned off to recover spent shale and fuel or synthesis gases (column 5, lines 15-24). Archer teaches a reaction temperature of 1400-1500ºF and a pressure of 30-50 psig (column 3, lines 48-66).

12. While Archer does not explicitly disclose a gas to solid volume ratio of 1-20:1, Examiner notes that Archer teaches that sufficient oxygen must be fed to the gasifier in order to consume the residual carbon present in the shale (column 7, lines 48-50).

13. Therefore, it would have been obvious to the person having ordinary skill in the art to have determined an appropriate volume ratio of oxygen gas to shale solid, in order to consume the residual carbon. Since Archer teaches the same process feed, steps, temperatures, pressures, and products, it is expected that the gas to solid ratio would correspond to that claimed.

14. Regarding claims 3-4, Archer teaches crushing and sizing the oil shale prior to pyrolysis. Particle sizes up to ¾ inch may be used (column 4, lines 48-58), which would encompass the claimed ranges of 50-500 and 60-200 micrometers. Examiner further notes that it is well known in the art to crush shale particles to obtain uniform size for ease of fluidization.

15. Regarding claim 5, Archer teaches that the pyrolysis reaction zone has a pressure of 30-50 psig and a temperature of 700-1200ºF (column 3, lines 48-53).

16. While Archer does not explicitly disclose a gas to solid volume ratio of 1-20:1, Archer teaches that it is critical to control the temperature in the gasifier. Temperature can be controlled by adjusting gas flow and/or shale particle flow (column 7, lines 28-36).

17. Therefore, it would have been obvious to the person having ordinary skill in the art to have determined an appropriate volume ratio of gas to shale solid, in order to control the temperature. Since Archer teaches the same process feed, steps,

temperatures, pressures, and products, it is expected that the gas to solid ratio would correspond to that claimed.

18. Regarding claim 9, Archer teaches using fluidized bed reactors (column 4, lines 21-27). It is further noted that various modes of operation for fluidized bed reactors are well known in the art, and it would have been obvious to the person having ordinary skill in the art to have appropriately selected which to use.

19. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Archer (US 4,412,910) in further view of Lawson (US 3,440,162).

20. Regarding claim 6, Archer teaches the limitations of claim 1, as discussed above.

21. Archer does not explicitly disclose passing heavy shale oil from fractionation back to the pyrolysis zone.

22. However, in the analogous art of oil shale retorting, Lawson teaches a similar process in which shale is subject to pyrolysis and combustion (column 2, lines 33-40 and 65-72, see also figure 1). The oil products discharged from the pyrolysis zone are sent to fractional distillation towers to obtain the various product fractions (column 2, lines 36-52). The heavy shale oil fraction is recycled back into the pyrolysis zone (column 2, lines 52-55).

23. Therefore, it would have been obvious to the person having ordinary skill in the art to have recycled the heavy shale oil fraction back into the pyrolysis zone for further conversion. Examiner notes that while fractionation into various fractions is disclosed, Lawson does not specify which products are obtained. However, since the prior art

teaches the same process feeds, steps and conditions, it is expected that the same products will be obtained.

24. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Archer (US 4,412,910) in view of Lawson (US 3,440,162) as applied to claim 6, and further in view of Burton (US 4,148,710).

25. Regarding claim 7, Archer in view of Lawson teaches the limitations of claim 6, as discussed above.

26. The previous combination does not explicitly disclose further separating the tower top gas and recycling the dry gas back to the fluidized bed reactor for distillation.

27. However, Burton teaches a similar process in which particulate oil shale is fed to a fluidized bed retorting zone, and the retorted oil shale containing residual carbon is sent to a fluidized bed combustion zone (column 3, lines 16-24). The vapor products from the retorting zone are separated, and the separated off gas can be sent back to the retorting zone as fluidizing gas (column 5, lines 14-36).

28. Therefore, it would have been obvious to the person having ordinary skill in the art to have recycled the off gas obtained from retorting, so that it may be used as fluidizing gas. Examiner notes that while Burton teaches separating the vapor products, it does not specify the exact fractions obtained. However, since the prior art teaches the same process feeds, steps and conditions, it is expected that the same products will be obtained.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

29. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Alleman (US 2,647,077).

30. Regarding claim 10, Alleman teaches a fluidized bed reactor **14** with an inlet suitable to feed oil shale and gas through **16** (column 4, line 69-column 5, line 22), as well as two outlets **18** and **40**(column 5, lines 22-26, see figure). The vaporous products outlet is connected to separation zone **28** with outlets **34, 32 and 30** (column 5, lines 60-70 and figure). The shale outlet is connected to another fluidized bed reactor **38** which has flue gas and air inlets **42,** shale inlet **40** and oil inlet, and outlets for products **48, 44, 50** (column 6, lines 1-50, and figure).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHELLE STEIN whose telephone number is (571)270-1680. The examiner can normally be reached on Monday-Friday 8:30AM-5PM EST, Alt Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571)272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michelle L. Stein/
Examiner, Art Unit 1771

/PREM C SINGH/
Primary Examiner, Art Unit 1771